



**Lower Des Plaines Watershed Group  
Special Condition –  
Participation & Bioassessment Plan Implementation  
2019**

Special Condition Language included in Agency Member NPDES Waste Water Permits:

*Special Condition Y: The Permittee shall participate in the Lower Des Plaines Watershed Group (LDWG). The Permittee shall work with other watershed members of the LDWG to determine the most cost-effective means to remove dissolved oxygen (DO) and offensive condition impairments in the Lower Des Plaines Watershed to the extent feasible. The Permittee shall participate in the LDWG for the completion of the Bioassessment Monitoring Program Plan of the Lower Des Plaines Watershed Bioassessment Quality Assurance Project Plan dated July 27, 2018 (hereinafter the Plan) which will include biological, chemical and physical monitoring of the Lower Des Plaines River Watershed.*

- A. The LDWG will conduct the following activities in accordance with the Plan during the term of this permit:*
- 1. Conduct stream monitoring in Lower Mainstem Des Plaines River in 2018;*
  - 2. Conduct stream monitoring in Upper Mainstem and tributaries of the Des Plaines River in 2019;*
  - 3. Conduct stream monitoring in Hickory Creek Watershed in 2020;*
  - 4. Conduct stream monitoring in remaining tributaries of the Des Plaines River in 2021; and*
  - 5. Assess stream monitoring and develop recommendations for future stream monitoring in 2022:*
- B. The Permittee shall submit an annual progress report on the activities identified in (A) above to the Agency by March 31 of each year. The Permittee may work cooperatively with the LDWG to prepare a single annual progress report that is common among LDWG members.*
- C. In its application for renewal of this permit, the Permittee shall consider and incorporate recommended LDWG activities listed in any annual progress report or Nutrient Assessment Reduction Plan that the Permittee will implement during the next permit term.*

## **Participating Members:**

### Wastewater NPDES Permit Holders:

- Village of Channahon
- City of Crest Hill
- Village of Elwood
- Village of Frankfort
- Illinois American Water – Oak Valley, Santa Fe, Derby Meadows, Chickasaw Plants
- City of Joliet
- Village of Lockport
- Village of Manhattan
- Metropolitan Wastewater Reclamation District – Kirie & Lemont Plants
- Village of Mokena
- Village of New Lenox
- Village of Romeoville

### MS4 only Permit Holders:

- Village of Burr Ridge
- Village of Hinsdale
- Illinois DOT
- New Lenox Township
- Village of Westmont
- Village of Western Springs
- Will County

## **Bioassessment Monitoring Program Implementation**

The first round of bioassessment monitoring was completed in 2018 at half of the identified sites on the mainstem Des Plaines River. The second half of mainstem sites were scheduled for sampling in 2019. As outlined below, sampling was not completed in 2019 due to unsafe, high water conditions. A subset of stations will be resampled in 2020, all data collected on the mainstem will be compiled in a report that will be available in 2021. Details of the bioassessment program are below.

### **BIOASSESSMENT**

A biological and water quality survey, or “bio-survey”, is an interdisciplinary monitoring effort coordinated on a waterbody specific or watershed scale. This may involve a relatively simple setting focusing on one or two small streams, one or two principal stressors, and a handful of sampling sites or a much more complex effort including entire drainage basins, multiple and overlapping stressors, and tens of sites. The LDWG bioassessment is the latter. The LDWG bioassessment program continued in 2019 with sampling 33 stations in the upper portion of the

mainstem Lower Des Plaines River and several tributaries to this section. See table below for complete sampling schedule. The Bioassessment includes fish, macroinvertebrate, QHEI – Habitat and water chemistry at all sites and sediment sampling at a subset of sites. **Due to continued rain events across the watershed during the traditionally “dry period” causing unsafe conditions, collection of the second round of fish and macroinvertebrate sampling plates was not completed. A subset of the mainstem sites will be resampled in 2020. Results and reporting will be combined with data collection from 2018, 2019 and 2020 will be available in 2021.**

Watershed	Year Sampled	# of Stations
Lower mainstem Lower DesPlaines	2018	29
Upper mainstem Lower DesPlaines + northern tributaries	2019	33
Hickory Creek subwatershed	2020	50
Remaining Tributaries	2021	56

The LDWG bioassessment program utilizes standardized biological, chemical, and physical monitoring and assessment techniques employed to meet three major objectives:

- 1) determine the extent to which biological assemblages are impaired (using IEPA guidelines);
- 2) determine the categorical stressors and sources that are associated with those impairments; and,
- 3) add to the broader databases for the Des Plaines River watershed to track and understand changes through time in response to abatement actions or other influences.

The data collects as part of the bioassessment is processed, evaluated, and synthesized as a biological and water quality assessment of aquatic life use status. The assessments are directly comparable to previously conducted bioassessments such that trends in status can be examined and causes and sources of impairment can be confirmed, amended, or removed. A final report containing a summary of major findings and recommendations for future monitoring, follow-up investigations, and any immediate actions that are needed to resolve readily diagnosed impairments is prepared following each bioassessment. The bioassessment reports will be posted on the LDWG website. It is not the role of the bioassessments to identify specific remedial actions on a site specific or watershed basis.

Sampling sites for the bioassessment were determined systematically using a geometric design supplemented by the bracketing of features likely to exude an influence over stream resource quality, such as CSOs, dams and wastewater outfalls. The geometric site selection process starts at the downstream terminus or “pour point” of the watershed (Level 1 site), then continues by deriving each subsequent “panel” at descending intervals of one-half the drainage area (D.A.) of the preceding level. Thus, the drainage area of each successive level decreases geometrically. This results in seven drainage area levels in each of the three watersheds, starting at the largest (150 sq. mi) and continuing through successive panels of 75, 38, 19, 9, 5 and 2 sq. mi. Targeted

sites are then added to fill gaps left by the geometric design and assure complete spatial coverage in order to capture all significant pollution gradients including reaches that are impacted by wastewater treatment plants (WWTPs), major stormwater sources, combined sewer overflows (CSOs) and dams. The number of sampling sites by method/protocol and watershed are listed in Table 1 and illustrated in Figure 1.

#### Representativeness – Reference Sites

Data is collected from selected regional reference sites in northeastern Illinois preferably to include existing Illinois EPA and Illinois DNR reference sites, potentially being supplemented with other sites that meet the Illinois EPA criteria for reference conditions. One purpose of this data will be to index the biological methods used in this study that are different from Illinois EPA and/or DNR to the reference condition and biological index calibration as defined by Illinois EPA. In addition, the current Illinois EPA reference network does not yet include smaller headwater streams, hence reference data is needed to accomplish an assessment of that data. Presently thirteen (13) reference sites have been established.

The bioassessment sampling includes four (4) sampling methods/protocols: biological sampling, Qualitative Habitat Evaluation Index (QHEI), water column chemical/physical parameter sampling and sediment chemistry. The biological sampling includes two assemblages: fish and macroinvertebrates.

#### **FISH**

##### Methodology

Methods for the collection of fish at wadeable sites was performed using a tow-barge or longline pulsed D.C. electrofishing apparatus (MBI 2006b). A Wisconsin DNR battery powered backpack electrofishing unit was used as an alternative to the long line in the smallest streams (Ohio EPA 1989). A three-person crew carried out the sampling protocol for each type of wading equipment sampling in an upstream direction. Sampling effort was indexed to lineal distance and ranged from 150-200 meters in length. Non-wadeable sites were sampled with a raft-mounted pulsed D.C. electrofishing device in a downstream direction (MBI 2007). Sampling effort was indexed to lineal distance over 0.5 km. Sampling was conducted during a June 15-October 15 seasonal index period.

Samples from each site were processed by enumerating and recording weights by species and by life stage (y-o-y, juvenile, and adult). All captured fish were immediately placed in a live well, bucket, or live net for processing. Water was replaced and/or aerated regularly to maintain adequate D.O. levels in the water and to minimize mortality. Fish not retained for voucher or other purposes were released back into the water after they had been identified to species, examined for external anomalies, and weighed either individually or in batches. While the majority of captured fish were identified to species in the field, any uncertainty about the field identification required their preservation for later laboratory identification. Identification was made to the species level at a minimum and to the sub-specific level if necessary. Vouchers were deposited and verified at The Ohio State University Museum of Biodiversity (OSUMB) in Columbus, OH.

## **MACROINVERTEBRATES**

### **Methodology**

The macroinvertebrate assemblage is sampled using the Illinois EPA (IEPA) multi-habitat method (IEPA 2005). Laboratory procedures followed the IEPA (2005) methodology for processing multi-habitat samples by producing a 300-organism subsample with a scan and pre-pick of large and/or rare taxa from a gridded tray. Taxonomic resolution is performed to the lowest practicable resolution for the common macroinvertebrate assemblage groups such as mayflies, stoneflies, caddisflies, midges, and crustaceans, which goes beyond the genus level requirement of IEPA (2005). However, calculation of the macroinvertebrate IBI followed IEPA methods in using genera as the lowest level of taxonomy for mIBI calculation and scoring.

## **HABITAT**

### **Methodology**

Physical habitat was evaluated using the Qualitative Habitat Evaluation Index (QHEI) developed by the Ohio EPA for streams and rivers in Ohio (Rankin 1989, 1995; Ohio EPA 2006b) and as modified by MBI for specific attributes. Attributes of habitat are scored based on the overall importance of each to the maintenance of viable, diverse, and functional aquatic faunas. The type(s) and quality of substrates, amount and quality of instream cover, channel morphology, extent and quality of riparian vegetation, pool, run, and riffle development and quality, and gradient used to determine the QHEI score which generally ranges from 20 to less than 100. QHEI scores and physical habitat attribute were recorded in conjunction with fish collections.

## **Water Chemistry**

### **Methodology**

Water column and sediment samples are collected as part of the LDWG bioassessment programs. The number of samples collected at each site is largely a function of the sites drainage area with the frequency of sampling increasing as drainage size increases. Sediment sampling is done at a subset of 168 sites using the same procedures as IEPA.

The parameters sampled for are included in Table 1 and can be grouped into demand parameters, nutrients, demand, metals and organics. Locations of organic and sediment sites are shown on Figure 1. All sampling occurs between June and October of the sample year.

**Table 1.** Water Quality and sediment Parameters sampled as part of the LDWG Bioassessment Program.

Water Quality Parameters	Sediment Parameters
<p><b>Demand Parameters</b>                      5 Day BOD                      Chloride                      Conductivity                      Dissolved Oxygen                      pH                      Temperature                      Total Dissolved Solids                      Total Suspended Solids</p> <p><b>Nutrients</b>                      Ammonia                      Nitrogen/Nitrate                      Nitrogen – Total Kjeldahl                      Phosphorus, Total</p> <p><b>Metals</b>                      Cadmium                      Calcium                      Copper                      Iron                      Lead                      Magnesium                      Zinc</p>	<p><b>Sediment Metals</b>                      Arsenic                      Barium                      Cadmium                      Chromium                      Copper                      Iron                      Lead                      Manganese                      Nickel                      Potassium                      Silver                      Zinc</p> <p><b>Sediment Organics</b>                      Organochlorine Pesticides                      PCBS                      Percent Moisture                      Semi-volatile Organics                      Volatile Organic Compounds</p>